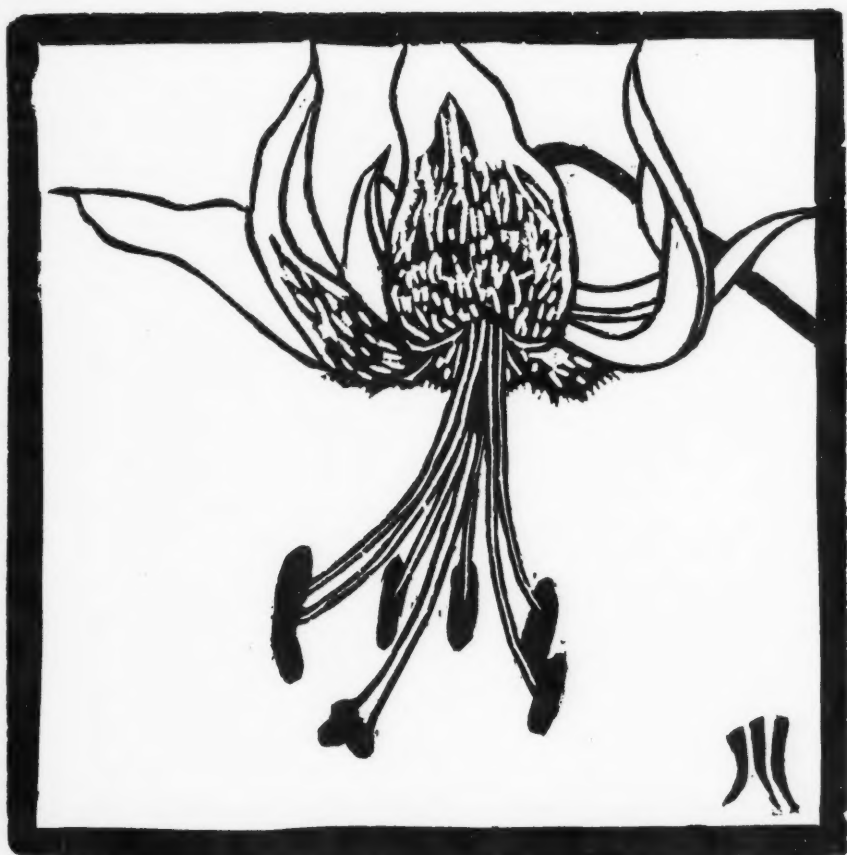


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Robert L. Taylor

Rhododendron Vaseyi

[See page 132]

The Upright Black Maple

B. H. SLAVIN*

This new form is a selection from the seed collected from a large Black Maple, located in the vicinity of Salamanca, New York, in 1903.

The seed produced one distinctly upright form, having strongly ascending branches, thus giving the whole tree a columnar outline. The tree may be seen to the south of Robinson Drive, in Highland Park, at Rochester, New York, and is coded as W-389 by the Bureau of Parks.

One year old shoots of this tree have lustrous, dark brown bark, conspicuously marked with round and elongated gray lenticles that vanish from the two year old wood, which becomes lustrous gray-brown. In spring the young leaves appear about two weeks later than those of *Acer saccharum*, and are sym-

metrically three-lobed, often with two additional abbreviated lobes above the deeply cordate base. The lobes are acute, entire, or obtusely toothed. The sides of the leaves are less drooping than those of the species. They are dark green above, light green and pubescent beneath measuring up to 23 cm. across and up to 19 cm. long. The petioles are terete, pubescent, and up to 18 cm. long. The tree now has a trunk diameter of about 4 decimeters, and a height of about 17 meters.

This clonal selection, budded on Black Maple, has major value as a street tree, and for ornamental purposes where a narrow up-right form of shade tree is desired. From the purely practical viewpoint it has the advantage of being a faster growing tree than most of the upright forms of the Sugar or Norway Maples.

*Bernard H. Slavin, Superintendent of Parks, retired, Rochester, New York.

A New Hybrid Maple

B. H. SLAVIN*

During the period 1900 to 1930, the Bureau of Parks, at Rochester, New York, was engaged in an ever-expanding program of woody plant collections now well known in horticultural circles throughout the country. During this time, it was my privilege to work with, and bring together, not only the more important, but also many of the lesser known groups of hardy trees and shrubs. As a result, by 1921, the park collections contained, along with many of the other genera, all of the known

species and varieties of *Acer* hardy in northeastern New York.

In 1919, while engaged in this work, I obtained seed from a single specimen of *Acer leucoderme*, growing in Seneca Park. This tree was growing in a planting containing numerous specimens of *Acer saccharum* that had been planted some years previously. Following our regular procedure, the seed was sown in flats and it produced about 150 seedlings. These were lined out in the park nursery. In 1925, nine of the best specimens were selected from the nur-

*Superintendent of Parks, Retired.



Upright Black Maple—Winter



Upright Black Maple—Summer



× *Acer senecaensis*
Winter and Summer

sery rows and made a part of the permanent plantings in Durand Eastman Park, which was then in an active stage of development. These trees are now thirty-one years old.

Even a casual examination of these trees shows that none came true to the seed parent. They are all hybrids, being intermediate between the seed parent *Acer leucoderme* and *Acer saccharum*, which was growing in close proximity to the seed tree. Among the nine specimens, the one showing the greatest contrast between the two parents, and incidentally, the best form, has been selected as the type, and has been named \times *Acer senecaensis*, for the park which produced the seed tree.

\times *Acer senecaensis* is now ten meters high, with a trunk diameter of three decimeters. It has a relatively short bole, with ascending and spreading branches, which give it a spread approximately equal to its height. The bark is dark grayish-brown, somewhat scaly, and becoming furrowed on the older branches. The one year wood is light brown or greenish brown, and winter bud scales dark brown. The leaves are 3-5 lobed, averaging 8-13 centimeters in width, with the base subcordate or occasionally truncate. The lobes are acuminate to long acuminate and variously sinuate-dentate. The foliage is green above and light green glabrous beneath, with tufts of hair in the axils of the veins. The petioles measure 9-11 centimeters long. The inner unfolding bud scales are linear, acute at the apex, and 2-3 centimeters long, be-

ing scarlet above the middle and pale green below. The flowers are small and yellow on slender, pendulous, glabrous pedicels, which measure up to 5 centimeters in length. The fruit is glabrous, with slightly divergent wings, measuring three centimeters in length.

This hybrid shows many characteristics intermediate between the two parents. The fall foliage tends more to yellow and orange than to scarlet, as in the case of the seed parent *Acer leucoderme*. It shows a faster growth at Rochester than *Acer leucoderme*, but does not have the vigor of the male parent, *Acer saccharum*. It differs also from *Acer leucoderme* in its larger leaves, which are glabrous beneath, as in *Acer saccharum*. The inner bud scales are wholly intermediate between the two parents, showing scarlet above the middle as in *Acer leucoderme* and pale green below as in *Acer saccharum*. The seed wings are also intermediate in length between the two parents, and divergent like the male parent, *Acer saccharum*.

Considering the value of the Maples, as ornamental trees, this hybrid is still further evidence that much can be done through breeding and selection, to develop better materials to meet specific needs in ornamental horticulture. Although \times *Acer senecaensis* will probably not contribute in any way to the list of improved shade trees of use in the Northern States, it should prove an addition to the better forms of well-shaped, spreading trees for the Middle Atlantic and South-eastern States.

The Gentle Art of Weeding

ALFRED BATE

In his essay on Gardens, Bacon observed that in the evolution of the arts man begins to make beautiful gardens only after he had erected stately buildings, "as if gardening were the greater perfection." Bacon was writing of the planning of gardens and of the finished composition, not of the upkeep or tendance. In those days of almost costless labor, no gentleman or lady would have thought of touching the soil. "Dirt gardeners" are one of the very few sane developments of recent years.

As "dirt gardeners" we know a great deal about digging and preparing the soil before planting, about setting out the plants and tending them while they are establishing themselves, about seed sowing, hybridizing, spraying and fertilizing, but surprisingly little about the art or skill of weeding. At least this is my conclusion from observation over a period of many years made in gardens tended by otherwise excellent "dirt gardeners" who either do all the work themselves or have a part time helper. All other phases of gardening we all do gladly and thoroughly but this latter skill we shirk or carefully perform so that Bacon, if he were writing today, might speak of weeding as the last acquired skill and therefore "the greater perfection."

That no garden looks better than after a thoroughly well done weeding is a boring platitude. In these days of high cost labor we cannot always disguise the fact that our plants grow on earth by completely hiding the ground with annuals; and for my part I would not desire to do so, well tilled soil is a joy in itself and brings into relief the vegetation on it. Yet, how often is the weeding done carelessly—plants bro-

ken, stems of tough weeds merely severed at soil level, small piles of wilting weeds left to be collected later, soil uneven and lumpy. Slovenly gardeners, you will say; I differ with you for I know several very meticulous gardeners who in the press of time have no qualms about leaving a weeding job in this condition when they would never think of walking away from a transplanting, a seed sowing, a pruning job. I also know several who habitually pull up large weeds, dropping them near by to be collected "tomorrow" and leaving the hole to be filled in by the rain; but would never think of not leveling the soil after planting bulbs.

So much for my accusations except that I would like to point out that we approach the weeding problem from the wrong angle: we dread it, think of it as a necessary hardship. It is not; it is an art, a skill, a relaxation. I have come to this conclusion, though I too once considered it a drudgery, by taking upon myself the weeding job when visiting my gardening friends and finding it a very pleasant way to relax in the sun and at the same time accomplish something toward the garden's well being. And because my friends express amazed appreciation at the results both in appearance and thoroughness I have concluded that an article on weeding might help to change gardeners' attitude and give hints to change their methods of work.

Every craft has its tools. The first one in this skill is a rubber kneeling pad, for one is going to spend several hours on his knees and the ground may be wet and certainly is hard. There are few who, like our editor, can crouch on their haunches for hours while weed-

ing or transplanting and fewer still who can stand and bend over to attack the weeds. I might here observe that one necessarily kneels which is a posture of reverence and that the medieval monks had a maxim, in these days it would probably be called a slogan, that "to work is to pray." Well it is. And I will go a bit further to say that in this kneeling posture of weeding one can meditate on many things; how well, depends upon yourself—and what you are interested in. And I wish to observe here that if you think about what a nasty job you have to do you will not get any good out of your kneeling—nor do a good or beautiful job of your weeding.

The second tool is a basket, large or small, for the weeds; never leave them on the ground both for neatness and because often seeds ripen on extracted weeds with surprising rapidity. If you use a small basket, a strawberry box type, have a large one on the lawn or the path into which the smaller one may be emptied from time to time; and the large one should be taken to the compost pile every time it is full, not heaped for then there is danger of scattering weeds along the path.

The third tool is a wire-pronged cooks' fork—which will never be found in the tool department of a seed store. Years ago as a child, I saw the grocer spear pickles from his pickle barrel with one and demanded it. My mother appeased me by promising to get me one; I demanded two; "why two?", "one to dig up seedlings, the other to bend the tines like a little rake to grub with." I have never been without several, bent to all sorts of shapes and find them the most valued of tools. Bring the long tines closer together and one can easily and safely extract the smallest of seedlings, bulbs and weeds when they are close beside plants. Left as

it is it is a perfect weed extractor for deep rooted and tough ones. With tines bent at right angle at about half an inch from the points it is a perfect grubbing tool and one with bent tines brought close together it is ideal for grubbing between small closely planted things. In these days one has to search for them; among kitchen gadgets one may find pressed steel flat pronged ones which should be avoided as they break easily. Country stores still have them and recently Woolworth have had them with gaily colored handles. They are well worth seeking out and treasuring when found.

The fourth tool is a narrow trowel; but with the cook's fork in your kit it is not absolutely necessary though it is very useful to dig out dandelion, plantain, dock and kindred deep rooted evils.

The fifth tool is a child's rake. Its light weight, short handle and narrow comb make it handy to smooth over the larger weeded areas and especially those beyond your arms length which you have had to stretch to reach in weeding.

The sixth tool is necessary only where large areas of weeds and grass where no plants or bulbs are growing are to be cleared. It is an ordinary hand fork with strong prongs; its usefulness will be detailed later.

The seventh thing necessary is a clear healthy mental attitude and patience to do a thorough job, and joy in that you will not only be helping the plants to be more comfortable and are creating a more beautiful garden but also in that you are helping to decrease the evils in the world.

As a skill, a craft, an art has its tools so too does it have rules of workmanship. After having tried out several methods of procedure I am certain that the best way is to start from some fixed

point and work forward, not backward. By this I mean to work with the unweeded part before you and thereby always seeing what is to be done, not what has been finished. Always place the weed basket upon the path, the lawn or the weeded area and never on the space to be cleared; it bends the weeds which makes them harder to extract. It seems hardly necessary to say that your tools should always be ahead of you where they may be readily seen when needed and no time wasted in looking for them. Yet you will be surprised at yourself to notice how many times you will forget to move them along with you as you work up the path. Often I have needed a tool which I have not used for a little while and have had to get up and walk down the path to retrieve it.

Whatever you are going to weed there will almost always be a path or a lawn from which you can start operations; but not always will you have a free space to work in at first if there is a thick edging of low growing plants along the path. In such cases I always start beyond the edging and after having cleared an area of weeds work back through the edging if there are weeds in it. With a small cleared space of loosened soil beyond the edging, weeds growing just within the margins of it are easily extracted by pulling them toward the loose soil. Weeds in the center of the edging are more of a problem; if they do not come up easily the kitchen fork, with tines drawn close together, can be used to loosen them with little or no disturbance of the edging plants.

An observation may be inserted here. I find that weeds which do not come up easily with a gentle pull may often be extracted by working them back and forth or with a circular movement while at the same time one gently pulls

on them. I only use the kitchen fork, when weeds are close to plants, after all efforts have failed. I can not emphasize this advice too strongly: coax the weed roots out by the above method and do not try to extract them by a strong sudden pull for by so doing you will more often than not break the weed stem at soil level and then have to dig the roots out, always a waste of time and harmful to any bulbs beneath the soil. Another advice may be given here; always draw the weed toward you and the loose soil you have just been working in. There are several reasons for this. Drawing the weed toward you is easier and more comfortable in your kneeling position than pulling upward or away from you. Then too the loosened soil forms less resistance than solid earth and the ground will crumble away from the weed's roots as you draw it out on a slant. As you are facing the unweeded portions you can more readily see what you are doing, how close weeds are to the plants, what seedling, which you may want to save, are growing among the weeds, what holes have been left by bulb stems which should at this time be thoroughly filled to prevent ants, bugs or slugs using them. When you expect to find seedlings it is advisable to have a strawberry box partly filled with soil handy so as to heel in the seedlings in it as you come across them and not expose their young roots to the air longer than necessary. It is a great annoyance to have to leave the weeding every few minutes to plant out seedling which you may want to save. By having the strawberry box with you you can safely store them for the time and set them out later.

After the first cleared space has been made and the edging weeded as far up the path as you can easily reach, work across the bed or border as far as you

can stretch. If there still remains an unweeded portion which cannot be reached from the back of bed or border (borders against a house or fence) and even by resting with one hand on a weeded area cannot be reached, the kneeling pad may be carefully placed between plants and knelt on with one's feet in the path and with shins bridging over the edging. (Skirts and even slacks are decidedly a hindrance at this time—play suits and shorts are far more desirable.) Only after weeds have been cleared from a strip all the way across the bed should one move up the path to the next section of operations.

When the kneeling position becomes tiring, and I can assure you that it will, I often sit on the pad with legs stretched out in front of me. This of course can only be done when working from a path or lawn. Then tools are handiest kept beside you on the other side from the area of work while the small basket is kept between you and the space being weeded.

It is advisable to rake over each section before beginning to weed the next. This saves one the trouble of going over the entire work later and has the advantage of leaving each section finished should you be called away before the entire job has been done. It also assures you of ample protection and covering of any plant roots which may have been exposed in the course of your weeding.

Having outlined the technique which I have followed for a number of years and consider the best method, at least for me, there remain some phases which should be decided by each weeder for himself. First, there is the problem of handling pests. Under this head I am not referring to spraying which should be done when needed and is not a part of weeding, but to ants, slugs and grubs. If during your work you

have uncovered ant hills and the inhabitants are so numerous that they interfere with your comfort, weed around the outskirts of their domain and bide your time. After sundown mix in a watering can a solution of Red Arrow in the proportion advised on the bottle and soak the ant-ridden area, being sure the solution runs down every channel. Time after time I have used this means of extermination and it has never failed me. When you expect to find slugs or snails it would be well to have a coffee can with salt in it into which they may be dropped as you come across them. Japanese beetle grubs may be given the same treatment if you are too squeamish to crush them between your fingers. And while on the subject of coffee cans their usefulness may be extended to the collecting of slivers of glass or china which are often in the soil of new gardens.

Then there is the question as to the application of fertilizer. My preference is to apply bone meal or dried manure after the entire weeding job has been finished. My reason for not applying it section by section as the weeding proceeds is that too often I either leave a gap between areas or overlap them. Then too I like to sprinkle after applying fertilizer so that it will sink immediately into the soil.

And now as to weather. Dry sunny days have the advantage that the weeds wilt quickly—but so does any plant which may have been disturbed at its roots; then too the soil may be so dry that weeding is difficult. Damp cloudy weather (unless the soil is sodden) has the advantage that weeds come out easily and root disturbance of plants is not serious but it gives the weeds on the compost pile a longer lease of life in which to ripen their seeds—and rain may come to stop your work. Usually I have no choice in the matter—week-

ends being what they are; but had I, I would prefer sunny weather following a rainy day.

Much can be said under the heading of seasonal weeding. Were I at liberty to spend all my time in the garden, I would have four great seasonal weeding with small special efforts between as cases demanded. I am optimistic enough to feel certain that a garden could be practically freed of weeds should one attack them regularly and systematically over a period of several years. I say this with full knowledge that birds will always bring in poison ivy, brier, etc., and that dandelions are always blowing.

Let us start with the late autumnal clean up after all bulbs have been planted and transplanting finished. Why not combine a thorough weeding as outlined above with this clean up? It would be a gala (dare I use that word?) performance and might, according to weather, last for a couple of weeks; but it would be wholesome to be in the sun (when possible) and heartening to know you are doing good deeds. As one weeds then, the dead stalks of plants could be cut down to within six inches of the ground; if one feared for the hardness of a plant the twiggy portions of the stems could be left about the crowns after having worked the soil in around them. Chrysanthemums, Japanese anemones, phlox, etc., should at this time have plenty of soil worked into their crowns. But remember that too early a use of this application for protection may give homes for field mice. At this time seemingly dead root clusters of stoloniferous grass can be taken out. It is *not* advisable to rake the beds and borders level if your garden has a tendency to be wet or undrained in winter or early spring. Far better would it be to rake slight

gullies to drain off surplus water to the front edge of bed or border where it can flow down path or lawn. During the winter chick-weed is likely to make every effort to annoy you and every opportunity should be taken to eradicate it; sorrel also often takes advantage of mild winter days.

Spring weeding is what I dislike most. If one does it early there is always the fear of disturbing the tender shoots of bulbs or plants; if it is done late there is the danger of breaking the lush bulb or plant foliage. But chick-weed, sorrel, grasses and a host of other evils are growing as rapidly as the garden plants and must be got rid of. It is always a slow and tedious labor. At this time the weeded ground should be raked level and all cracks in the soil made by the winter eliminated as well as the drainage gullies smoothed over. After this weeding is the time I most prefer to add fertilizer which then feeds both the flowering spring plants and those which will blossom through the summer. Whenever possible I prefer to do spring weeding the last of April or very early May.

For the third grand weeding spree I prefer mid- to late June; then everything has reached full growth and the spring bulbs have retired to rest. But long before this I have gathered up the dry dead foliage of the plants that have made Spring pleasant and stirred soil into the channels which the stems have left, lest ant or slug find easy access to root, bulb or corm below. It seems hardly necessary to warn against removing this foliage before it is thoroughly ripe, yet I have seen good gardeners whose misguided sense of neatness drove them into pulling off half ripened foliage or plaiting it and then hear them complain the next spring that their bulbs were not flowering well. At this weeding period certain

plants may need to be staked, which operation is an art in itself and I shall not dictate. But I will suggest that now is a good time to pinch back chrysanthemums for the first or second time depending upon your climate and also upon their growth.

Mid- to late August would be the next weeding festival and in the hot summer sun there should be little to do but just weed. If the jobs of the past have been thoroughly done there will be fairly little to be done now except for seedlings—both weed and plant. Advice as to flower seedlings has been given above. Small seedlings of weeds will usually die under the hot sun if merely raked loose, of course if they are numerous they must be gathered up; but remember, this is a lazy time so beware, for a rain may revive all the ungarnered weedlings and your half-done labor come to nought. Is there not a Scriptural text which reads "Be not weary of well doing?"

During the spring and June weeding, spaces where you may want to plant bulbs or to remove things should be marked while you know not only where the blank space is but how large it is. I have found it a good plan to have 6" wood labels at hand, thrusting them into each space after marking a number or name on them with wax pencil and also recording number or name with size of space in a note book. The label is always placed in the center of the space and when autumn comes and the bulbs are to be planted there is no worry about cutting into bulbs already there.

The above suggestions all pertain to the weeding of bed and borders; what follows are suggestions regarding the clearing of ground which is to be taken into cultivation and when it is not advisable to have it deeply enough trenched so as to bury all grass and

weeds. And I may point out here that a mere spade's depth is not enough to kill out most weeds and grasses. In such cases I find it best to use a spading fork and to loosen the ground in strips across the area by digging the fork fairly deeply and then almost lifting out the sod. This usually loosens the roots enough for easy extraction and deeply rooted things may be dug up with the trowel. But in heavy soils, especially when dry, one may have to turn the clod over and beat it with the back of the fork. I have started with the hardest type of area; when you are working on more open soil and more moist conditions the hand fork mentioned under tools will do the work better than a spading fork which necessitates your getting up and down frequently. The technique, however, is the same whichever tool is used. And no matter how thoroughly you do this job you may always count upon having to reweed later for seeds abound and weeds you do not find at first cleaning will mock you when once the area has been cleared.

A great many years ago an old doctor taught me the value of what he called his "plantain stick." An old broom handle is sharpened to a point at the end where the broom has been and a 2" block is nailed to the handle at about 3" from the point. The point is inserted into the ground next to the plantain for about 2" and the plantain pried or levered out by bearing down on the handle. In August when plantains are making next year's roots this is easily and quickly done. They are easily lifted out by using this device. One should always thrust the point into the earth just next to the weed's stem and see to it that the fulcrum (wood block) and your weight are in direct line with the stem of the weed.

New Jersey.

Air-layering a Rhododendron Hybrid

JOHN L. CREECH*

There is a constant striving to overcome the difficulties involved in the propagation of the large-leaved, evergreen Rhododendrons. While successful propagation by stem cuttings seems to be the desired goal, this certainly has not been satisfactorily attained at present and other methods such as grafting, leaf-bud cuttings and layering are resorted to. At the U. S. Plant Introduction Garden, Glenn Dale, Maryland, air-layering has been used to propagate the Rhododendron hybrid "America". This hybrid is considered to be one of the more difficult Rhododendrons to propagate.

Air-layering is considered a greenhouse technique but when the layering medium is encased in a moisture-proof plastic wrapping, the method can be extended to the field. Credit for the first use of plastics for air-layering goes to William Grove, who reported his work on the propagation of Lychee in the 1947 Proceedings of the Florida Horticultural Society. While our experience with plastic-wrapped air-layers has been limited to Rhododendrons, the principle appears to be very desirable for the propagation of our more difficult plants.

With the Rhododendron "America", the air-layers are made in early May on wood of the past season. The stem is slit as for mound-layering and a small quantity of indole-butyric acid, 8 mgs/gm of talc, is inserted into the wound with a knife blade. Moist sphagnum is squeezed as dry as possible and wrapped around the stem. This in turn is wrapped with an 8"x10" sheet of plastic; polythene was used in this particular work. The plastic wrap is tied at the top and bottom with rubber grafting bands, forming a watertight

sack (Page 115). There is no apparent moisture loss; during the extremely dry summer of 1949, the sphagnum remained moist without any further addition of water. Conditions inside the plastic sack are such that frequently the moss will actually begin to grow.

The layers made in May, 1949, were rooted in August of the same year and were potted, without removing the sphagnum, in five inch pots. The plastic wrapping showed no signs of deterioration and wraps that were first employed in 1948 are still being used. The potted layers are plunged in sand or peat in the propagation house where they remain until the following spring. In March, the growth begins both from the buds formed the past summer and adventitious shoots from the base of the plant. It is interesting to note that where the layer made a flower bud, this will break in the spring and flower in the same manner as do the rooted azalea cuttings. Because of the limited material available only 18 air-layers were made, but 11 rooted and grew. Any unrooted layers which had calused were also removed in September and placed in the sand bed but these did not root. This year layering was begun in April including such Rhododendrons as Marquis of Waterford, Lady Clermont and Album Elegans. Results obtained with these varieties will also be made available.

A note of caution in air-layering is that some plastics are not moisture-proof and others deteriorate after a week in the sun, but polythene had neither of these difficulties.

*Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture.



John L. Creech

Air-Layering—the plastic film, polythene, to wrap the sphagnum



John L. Creech

A three month's old layer on one year old wood, opened to show roots already penetrating the sphagnum



John L. Creech

*Layer made May 5, 1949, removed Aug. 5, 1949, when photographed in
September 1949, The roots had already reached the side of the
5-inch pot*

Double Working, The Art of Setting Graft Upon Graft

GEORGE GRAVES

The grafting or transplanting of a portion of one plant to another is an old, old art. The techniques employed to effect the application of scions to stocks were developed long ago and have undergone little change over the years. If anything, most present-day plant propagators are less versatile at fancy knife work than were their predecessors of centuries past. (56) (62) Few of them have ever made more than a fraction of the many kinds of grafts illustrated by Sharrock or Thouin.

The techniques may remain the same but understanding of grafting operations has improved over the often fanciful conjectures of classical authors of books on husbandry and horticulture as summarized at the end of the Sixteenth Century by such writers as Leonard Mascall and Barnabe Googe. (43) (22) For instance, evergreen roses are no longer expected to develop through the use of holly trees as stocks. Grape clusters made of several kinds of berries are not sought by rooting as single cuttings tightly bound (grafted) bundles of cuttings of miscellaneous varieties, as was projected by Columella at about the beginning of the Christian era. (13)

One such bit of ancient whimsy did prove prophetic. In 1582, Mascall described two grafting techniques, either of which would result in apple trees whose fruits would be half sweet and half sour. It may have been that Mascall knew of such a tree and tried to explain its origin, just as did certain Americans of a later period who were puzzled by a sweet and sour apple tree noticed in an orchard in Petersham,

Massachusetts, about the year 1800. Then, as earlier, the idea of two unlike scions set "joyning in the stock" was advanced. (43) (7)

Even in Mascall's time, however, the belief in the production of true hybrids as a result of grafting accidents was questioned. Francis Bacon in his *Sylva Sylvarum* observed that: "For so you may have great varietie of new Fruits and flowers yet unknowne, Grafting doth it not: . . . But it [grafting] hath not the power to make a new kind." Thus Bacon leapt to a conclusion which was to be laboriously arrived at by several investigators between his time and our own. (5) (59) Hybrids are now sought by genetic processes only. (54)

Modern ideas about the purposes and techniques of grafting may be said to have come in with Francis Bacon or, perhaps, with Ralph Austen, who published his *Treatise of Fruit-Trees* a few years after the posthumous publication of *Sylva Sylvarum*. The third edition (1665) of Austen's treatise had appended to it *Observations on Some of Sir Francis Bacon's Natural History*; and included, as well, the section on *Errors Discovered* of earlier editions. In the latter, Austen approached his appraisal of available literature in a most judicial manner. Let not, he wrote, men think that *Ancient* and *Learned Authors* have discovered *all truths*: or that *all* they have said is *truth*; they are but men and have their *Errors*. It's not any great matter what men have thought, but what is the *truth* of the matter. (3)

Where Bacon departed from his own

pronouncement that: "The *Cions* ever over-ruleth the *Stocke*" to suggest that grafting, "for the most part, doth meliorate the fruit," Austen disagreed. He held that: "a tree will not be better for grafting, unless the grafts be taken from a good tree." He also pointed out that Bacon's idea of "Oft Regrafting," that is, transferring the same scion to a new stock each year for several years before putting it on a permanent one to cause it to bear "the greater *Fruit*" was nothing more than standard nursery production practice which had thus far done nothing in the way of "meliorating" the fruit of established varieties. Even so, this line of thinking of Bacon's seems to have actuated the scheme by means of which European growers of a century and a half later sought to improve fruit quality by repeated "Enoblings" or regrafting on one stock after another, using the best varieties rather than wild seedlings as successive stocks. (38)

Even though Austen held that the basic characteristics of the fruit were controlled by the scion and, like Bacon, seems to have had no faith in hybridizing by grafting, he suggested: "Set graft upon graft for divers years together. The sap passing through the many kinds of stocks will cause influence unto the fruit of the last graft." His advice was not to mix widely differing stocks but to put apple exclusively on apple, pear on pear, et cetera. (4) Thus, he would "enoble" in vertical fashion. In this, Austen foreshadowed the currently popular practice of double working based on the modern observation that stock effects upon the scion variety can be caused by the stem portion of the stock. (50)

The conception of "meliorating" the fruit of the last graft can, it has since been noticed, materialize in reverse. A. J. Heinicke offered evidence of one

such instance in the McIntosh apples at Ithaca, N. Y., which were modified by scions of Tompkins King and Benoni which were grafted farther out on the branches on which the affected fruits were borne. The fruits of the stock immediately below the graft unions had aspects of those of the scion variety. (27)

Philip Miller of *Gardeners Dictionary* fame wrote down what must have been contemporary opinion as to how to make pears ripen earlier, be of better quality and keep longer by grafting on pear stocks raised from seeds taken from trees which bore "austere" fruits. This improvement could, he wrote, be made by direct working on the hard winter pear or by double working with the hard winter pear as intermediate between the free stock and the scion variety. (45)

In this connection, it is interesting to note the remark in Burbidge's *Cultivated Plants* that: "In soils which do not suit the quince, but in which the pear luxuriates this order (pear on pear on quince) may often be reversed by using some good-constituted pear as the rootstock on which to graft the quince, which again, in turn, is worked the following year with the kind of pear desired to form a fruiting specimen." (10)

Knowing that the quince is the classic dwarfing stock for the pear, one wonders if Burbidge, by using quince intermediates, got reduction in plant stature and accompanying younger bearing, as did H. B. Tukey and K. D. Brase when, at Geneva, N. Y., many years later, they imposed a three-inch stem-piece of apple Malling IX scion wood between a scion variety of apple and a French crab seedling stock. (63) Or, as did T. J. Maney of Iowa when he used a like intermediate stem-piece of the very hardy apple Clark Dwarf

to produce apple trees which grew to be but five to seven feet in height in 10 years, fruited more regularly and had better root systems than would have been true if the dwarfing stock had been grown upon its own roots instead of grafted, as it was, upon a vigorous seedling. (41)

These modern instances confirm in most respects the Seventeenth Century observations of John Rea who in the course of dwarfing apples by grafting on Paradise stocks was inconvenienced by the slowness of development of seedlings and layers of Paradise. In 1665 he reported that: "I have found out another expedient to help them forward, that is, by grafting the *Cyen* of the *Paradise Apple* in a *Crab*, or other *Apple-Stock*, close to the ground, with one graft, and when that is grown to the bigness of a finger, graft thereon about eight inches higher, the fruit desired, which will stock the luxurious growth of the Tree, almost as well as if it had been immediately grafted on the forementioned Layers, and will cause the Trees to bear sooner, more and better fruits."

Similar manipulating of herbaceous stems has not always shown stock effects such as those noticed by the fruit-tree propagators. F. W. Went, working with seedlings of the garden pea, reported that when: "Stem pieces of varieties which as [stocks] produce considerable differences in the scion growth are grafted as intermediate stems between pieces of one test variety, they do not influence the scion." (66)

In woody stems, it has been discovered that only that portion of the stem of the stock which functions to transport the mineral uptake of the roots and to lay down new wood may be involved in causing stock effects. Acting on this suggestions, R. H. Roberts of

Wisconsin and others have been able to produce double-worked young apple trees by the mere replacement of a ring or section of bark instead of the interposing of a fragment of whole stem of the desired intermediate. (51) (52) (53) Because any subsequent new wood at that point will be laid down by the transplanted bark section, the stem portion enclosed by it will thicken and eventually become a true intermediate stem-piece.

The hope of better fruit quality as the only outcome of what an anonymous author of 1780 called "Grafting Reiterated" or grafting by a double or triple "incision" has come down pretty much to our own day. The assertion of that particular writer was that: "The oftener the tree is grafted the finer fruit it produceth." (47) Flower improvement, too, was long ago credited to the mere act of double working. Late in the Seventeenth Century, John Worlidge recorded that the double-flowered yellow Province-Rose would bring forth "fair and kindly" flowers if worked on a branch of a single yellow rose which had been budded now on *Rosa Francofurtana*. Whether the double working or the restriction to a few flower buds as a result of the hard pruning of the second scion which Worlidge advised made the blooms more fair and kindly is open to question. (67)

As far as fruit change is concerned, it seems impractical to try to follow the conclusion of the reporter of the December 15, 1868, meeting of the Royal Horticultural Society who credited double working to the fact that the exhibit of Bess Poole apples grown by grafting that variety on Pearmain on crab stock was better in quality than that from plants of the variety worked directly on the crab stock. (10) Choice of combinations grafted and not num-

ber of times grafted would seem to be the deciding factor. Therefore, no attempt is here made to subdivide the considerable literature of stock and scion relationships as they affect fruit size, color, yield, quality, and time of ripening into separate categories of single and double working. (28)(29)(33)(40)(44)(65)

Not all of the older authors had implicit faith in the mere act of grafting as a fruit-improving device, or looked upon grafting as a technique to be used solely for that purpose. It was, for instance, traditional belief that winter pears worked on quince stocks produced scanty crops of ill-tasting, gritty fruits. It was also known that certain varieties of pears would not thrive or even live long when dwarfed by being grown on quince roots. According to the revisions in successive editions of Miller's *Gardeners Dictionary*, it was about the middle of the Eighteenth Century that it became generally realized that the way to succeed with dwarf trees of pear varieties which will not grow well if they are "immediately buded or grafted on Quince stocks" is to bud first on quince stocks varieties which will take freely and "when these have shot, the sorts you intend to cultivate should be buded into these." (45) This dodge has come down as standard practice with accumulating listings of combinations, congenial and otherwise. (2)(12) Miller also set the style for later writers when he pointed out that double-worked trees must be higher in initial cost.

Double working as a means of overcoming stock and scion incompatibility in pear dwarfing is a matter of contemporary interest. N. H. Grubb, in trials at East Malling, England, found that the intermediate pear stem-piece not only makes possible the growing on quince of pear varieties not compatible

with that stock, but, also, exerts stock influence on the vigor of the second scion and influences the time of that scion's coming into bearing. (23) In this same connection, the quinces themselves have been studied and standardized in an attempt to get away from their former lack of uniformity in vigor, health, habit, time of maturity and other variables which cause U. P. Hedrick to state in *Pears of New York* in 1921 that: "A suitable quince stock is not in sight." (25)(26)

What may be, perhaps, the earliest available record of double working in the nursery had also to do with circumventing an uncongeniality of stock and scion. In his *Paradisi in Sole Paradisus Terrestris*, published in 1629, John Parkinson wrote: "I say for some sorts, and not for all: the greene and the yellow Nectorin will best thrive to be grafted immediately on a plumme stocke: but the other two sorts of red Nectorins must not be immediately grafted on the plumme stocke, but upon a branch of an Apricocke that hath been formerly grafted on a plumme stocke, the nature of these Nectorins being found by experience to be so contrary to the plumme stocks that it will starve it, and both dye within a year, two or three at most." With this advice, Parkinson set the pattern for the propagation of certain varieties of Nectarines for a long time afterwards. (49)(3)(19)

Interposing an intermediate stem-piece of a variety which has been proved by separate independent graftings to be compatible to both a stock and a scion known to be uncongenial does not always solve the problem of how to grow that particular scion on that particular root. For example, H. E. Jacob, working with grapes, reported from California that he was unsuccessful in getting grafts of the variety

Emperor to live on 57-R stocks. His comment was that: "The Emperor-57-R combination has been particularly interesting because successful bench grafts of the reciprocal combination 57-R on Emperor have been obtained. Alicante Bouschet grows well on 57-R; Emperor grows on the Alicante Bouschet. Successful double grafts of 57-R on Alicante Bouschet on Emperor and of Alicante Bouschet on 57-R on Emperor have been made, but grafts of Emperor on Alicante Bouschet on 57-R failed. (34)

With the problems of incompatibility or uncongeniality of scion and stock becoming better understood through trial and error testing of all manner of combinations under differing environmental conditions in many places, over a long period of time, double working of practical purposes. One such purpose is the control of future growth through suitable association of stock and two scions at the nursery propagation stage.

In the case of the traditional dwarfing of pears, the complete assembly of the composite plants was not all done at one time. The first scion was given a season's growth on the stock before it, in turn, was topped with the second. R. C. Knight of East Malling found that propagation on this time-lapse basis might have its effect on the final result. He studied a group of Lane's Prince Albert apple as second scion on the four combinations of the vigorous Malling I and dwarfing Malling IX as stock and intermediate stem-piece. The fact that the combinations were not completed at one time gave a whole growing season's opportunity for the root systems to be modified, as Knight stated they could be, by the respective vigorous or dwarf scions being grown to become intermediates the following year. Thus, root systems of the two se-

ries were probably not comparable at the time the final grafting was done. As for the influence of stock on scion, Knight concluded that the part played by the stock stem in influencing the scion is subsidiary to that played by the root system. (35) (36)

Elimination of the stock-stem influence by grafting the intermediate directly onto the stock roots might lead to the confusion of a study such as Knight's through the possible formation of roots by the first scion. On a practical basis, however, such formation of first scion roots and the subsequent changeover from a double-worked plant to a simple combination of a stock and one scion can be desirable. The act of double working by root-grafting the first scion to readily available seedling starter or nurse roots has been used for stocks which are wanted on their own roots but which are not readily propagated by vegetative means. This is an outgrowth of the mid-western American practice of using long scions with deeply buried graft unions to get eventual own rooting for varieties of apples which were harder than the commercial seedling roots on which they were being worked. (58)

According to T. J. Maney, the true Virginia crab stock has long been grown by root grafting, that is, with no stock stem present. (39) Before roots form at the base of the first scion in such cases, the stem of that scion acts as an intermediate stem-piece to give stock effect on the later added second scion. However, a variety which may make a suitable intermediate stock for double working purposes may not be as effective on its own roots. This fact, F. P. Cullinan found, does not seem to be due entirely to the ability of the scion to make roots. (14)

Also from East Malling, M. C. Vyvyan reported on a series of double-

worked plants of the apple variety Stirling Castle on the four possible combinations of Malling IX and Malling XII, with all grafts made at the same time. The intermediate stem-piece, he noticed, had no perceptible effect on the morphology of the root systems and less effect on the growth of the stock contributing the root system than on that of the second scion, which latter influence was considerable. The trees with the vigorous rootstocks and dwarfing intermediates formed fewer fruit buds per meter than those with the dwarfing rootstocks and the vigorous intermediates. (64)

Double working apple trees in the nursery has been found to influence the ultimate size of tree and its yield of fruit, depending upon the variety used for intermediate stem-piece. F. N. Hewetson reported that the none-too-vigorous apple variety Steele Red was stimulated into forming large, high-yielding trees by Northern Spy intermediates. Red Astrachan intermediates grew large Steele Red trees but decreased yield. Yellow Belleflower did not stimulate growth but decreased yield, whereas Virginia crab produced small trees with the highest yield. The variety McIntosh, in Hewetson's trials, was reduced in tree size, hastened into maturity and displayed increased fruit color when the dwarfing variety Malling IX was used as intermediate. (28) (29)

The nurseryman's belief in working weak-growing varieties high on plants of more sturdy ones led to the development long ago by some Continental European growers of fruit trees of the so-called stem-builder or trunk-former process. In the course of this process, the second scions are grafted high—higher than its suitable for American preference—on long intermediates of certain varieties specially selected for

the purpose. This is a contemporary expression of the old European custom of double working *Crataegomespilus* and weak-growing varieties of Hawthorn on stem-pieces or "stem builders" of double pink hawthorn, medlar or mountain ash previously grafted on vigorous hawthorn seedlings. (6)

Grubb tested three of these stem-building varieties obtained from German growers on Malling IX and Malling XII, with the variety Early Victoria, which ordinarily reacts noticeably to varying stock influence, and with Newton Wonder, which does not. The Continental claims for stouter stems and a larger proportion of merchantable trees in the nursery row as a result of regrafting the first or stem-building scions after two years' growth from the bud, at a height of five feet, were confirmed. When it came to the plant-to-plant evening up of rootstock influence, claimed for the process, the results were slight. Any such evening up or uniformity which occurs can be attributed, Grubb suggested, to the invigorating effects of the intermediates on the second scions. Such invigoration would, he stated, be likely to be proportionately greater amongst the weak trees than amongst the vigorous trees, for the reason that the latter are closer to the upper limit of rate of growth than the former. . . . The prospect of ever obtaining a similar performance from trees on rootstocks of widely different influence by the use of any one intermediate variety seems remote. Rogers, Beakbane and Field, who studied the root systems of Grubb's stem-built trees, found that the vigor of the root system was modified but the difference in vigor of roots of Malling IX and Malling XII was not eliminated by the stem-builder intermediates. The structural characteristics of the

respective root systems were not influenced. (24) (55)

The ultimate tests of varieties for use as "stem builders" or "trunk formers" must, as F. C. Bradford pointed out, be made in the orchard. First, however, selections must be made in the nursery to obtain varieties which make at least average growth after budding and can be worked readily with the second scions at an advantageous time. As part of the search for likely stem builders, Bradford reported on the early nursery performance of about three dozen likely stem-building varieties as compared to the already well-tested Virginia crab. (8)

The matter of dwarfing incidental to the hard pruning which accompanies grafting has had some notice in connection with the double working of nursery trees. In Grubb's test, cited above, the lateral shoots of the intermediates of "stem builders" were kept short by pinching during the season, before grafting to the second scion, and in the season just following. The next year, these side growths were all removed and the stems thereafter were kept free of laterals. F. C. Bradford and L. E. Joley, working with a Wine-sap sport on one-year buds of Jonathan apple, found that those trees whose intermediates were kept free of lateral growths and foliage, beginning with the first year after grafting to the second scion, were the best, and those with foliage only on the lower half of the intermediate were next in quality. These plants made a greater length of second scion growth, which gave more leeway for the proper spacing of scaffold branches, all other laterals being removed from the scion growth in the course of forming the heads of the young trees. (9)

The double working just discussed involves very largely the production of

plants in which all grafts are made on the main stem or trunk, with the second scion forming the head. As has been indicated, it can be entirely a nursery operation, although, very often, it is not. The final graft may be set soon, or, perhaps, many years after the stock, with its first scion in place, has been moved to a permanent planting location. Here, too, only the trunk need be involved in grafting operations, even on older trees, as was customary hundreds of years ago in Worcestershire in England, where large scions of bearing wood are said to have been set in trunks of older trees cut to a height of two or three feet. (60)

More often, double working on permanently located stocks takes place on their branches, so that more or less of the major framework of a composite tree is formed by the intermediate. Double working by inserting scions at intervals throughout the branch system of the head of a tree whose trunk and branches are different from the root on which it is growing is but a special case of the traditional top working by means of which established trees have, since early times, been made to carry growth other than their own. The literature of nut growing serves as an illustration.

Top working to change varieties automatically becomes double working when the stocks are grafted plants, as when William Forsyth advised regrafting of trees which, after years of waiting for bearing to start, reveal by inferior fruit quality that the nurseryman had made a mistake in labeling. (18) In this, as in all other grafting, congeniality of stock and scion is an important factor, and a slightly more confused one because reworking involves the joining of varieties about which not too much in the way of stock influence is known. T. J. Maney assembled a

sizeable listing of stock-scion relationships based on experience in top-working trees of numerous varieties of apples. (40) H. J. Webber reported on successful and unsuccessful combinations in citrus top working, with a suggestion that uncongeniality of certain stocks and scions may be overcome by the use of suitable intermediate stem-pieces. (65)

Top working has not always been done by reworking whole trees to single varieties. Present-day nursery catalogues offer apple trees capable of bearing fruit of several varieties, thus following the observation of Francis Bacon that: "It is a *Curiositie* to have *severall Fruits* upon *one Tree*. . . ." Sometimes, as when branches of pollinating varieties are grafted on, several kinds upon a tree can be more than a curiosity. (48)

Top working or double working has been known to circumvent plant diseases such as shell bark of lemons, collar rot of Grimes apple and bacterial canker of plums. (65) (44) (46) In the case of fire blight on pear, resistant intermediates have been used to support susceptible varieties, but own-rooted resistant stocks would probably serve as well. (15)

More recently, a refinement of top working called frame-working has been widely employed in various parts of the world. Frameworking, which seems to be what one William Fairman long ago termed "extreme-branch grafting" or what is often referred to as "porcupine" grafting, retains but changes the

variety of the complete, or nearly complete, superstructure of a tree. (61) Its purpose is a quick return of a tree to profitable bearing of more desirable fruit. (21) (31) (32)

Whatever method of grafting is followed, it is believed that the hardiness of the scion is independent of that of the stock. (16) (37) (57) On the other hand, the hardiness of the stock can be greatly influenced by that of the scion. (17) (57) Therefore, the present practice of top working fruits on hardy intermediates to avoid low temperature injury seems not to be done in an attempt to make the scions hardier, but rather to take advantage of the fact that the destruction caused by winter cold occurs mostly on the trunk and at the branch crotches. (16) (30) (42) This operation falls into the category of double working when the stem builder or trunk builder is itself propagated by grafting.

Double working is becoming better understood, although probably not much more popular at the general orchard level than it was years ago. The report of a survey taken in 1906 by F. W. Card is still interesting to read, particularly conclusion No. 7 — "For ordinary varieties, in favorable regions, the disadvantages of double working outweigh the advantages. Like many other things which are good in their place, this practice seems to have been used where entirely unneeded." (11) Even nature does that, however, as in the cases where mistletoe has been found parasitizing itself. (20).

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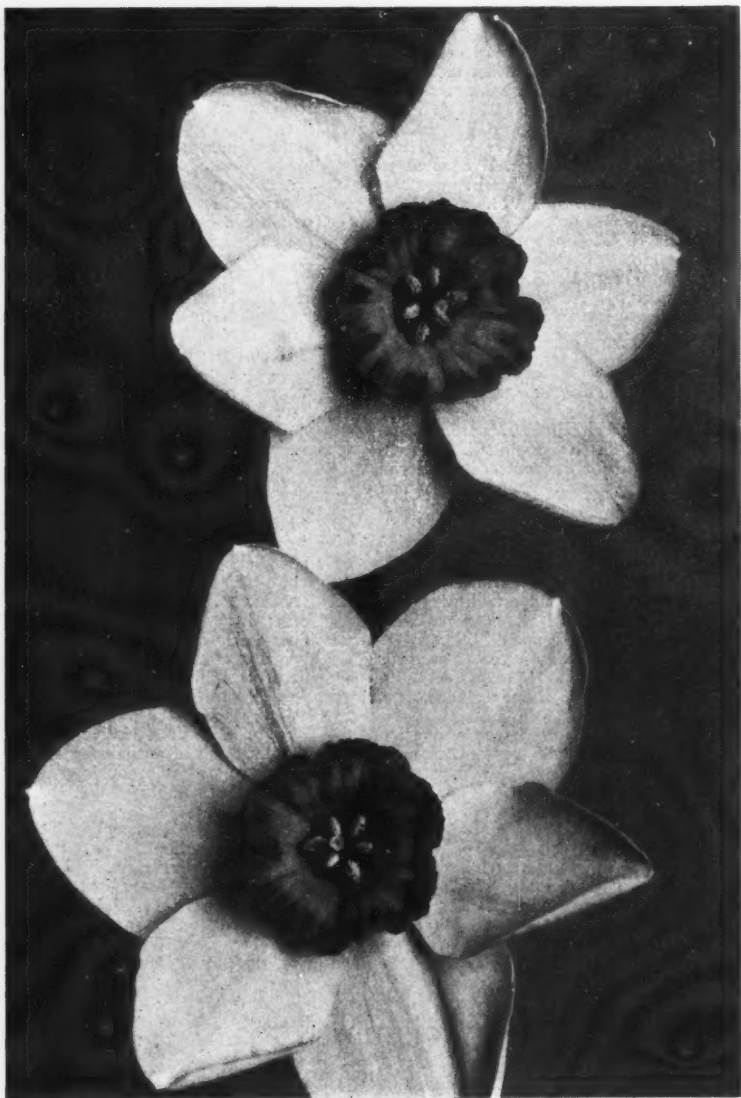
Narcissus Notes

B. Y. MORRISON, Editor

Daffodils, Margaret Fell and Klingo

It is seldom that one finds two daffodils that adapt themselves to this climate as satisfactorily as have Klingo and Margaret Fell.

Coming from Australia Margaret Fell's ready adaptation to this section where we frequently have too little rain during the growing season is expected. Even with filtered morning shade the



Robert L. Taylor

Narcissus, Margaret Fell



Robert L. Teylor

Narcissus, Klingo

orange red band on its crown usually fades to a light orange.

But as most brightly colored daffodils have this fault here we do not count this against it. Even with a light application of 4-12-4 fertilizer about the time the tops show, which is so conducive to good color, it is necessary to have a few cloudy days for its color to be at its best. Its increase has been excellent, giving nice-sized bulbs and few thin slabs as so many varieties do. It is a mid-season variety.

Klingo has given equally good in-

crease and it is a prolific bloomer. Here, in the average season, the whole crown is not orange-red, but it does have a deep rim which blends to yellow about half its depth. It usually comes into bloom about two days before Margaret.

We would recommend these two varieties to the beginner who is looking for good performance, a wealth of bloom and rapid multiplication without coddling.

ELEANOR HILL

Tulsa, Okla.

Rhododendron Notes

CLEMENT GRAY BOWERS, *Editor*

Rhododendron Mariesii Hemsley and Wils. (See page 131)

In the section of azaleas that is most commonly known in this country by *R. Schlippenbachii* and to a lesser degree by *R. reticulatum*, this species is little known. The Division of Plant Exploration and Introduction has had seed several times from Oriental sources but all proved to be other species until two recent lots sent in through the kindness of Dr. Andrew Tse who has been helpful in getting seeds of wild forms of *R. Simsii*, turned out to be this species.

Although the plants are too young to show adult bush characters, they suggest an upright habit with eventual broad flat topped branching. In their present state they are rather stiff and ungraceful.

The range as given by Wilson (A Monograph of Azaleas, page 81) is "distributed from Fokien and Chekiang provinces of eastern China westward to southeastern Szechwan." The color note as given, "Pleasing pink to rose-colored flowers" has not been justified

by the plants that have bloomed here, all of which are definitely lavender pinks, nearer lavender than pink, but since there is some range of tonalities it may easily be that other plants will flower with better colors. The leaves show the rhombic shape one first learned on *R. reticulatum* but as in many other azaleas, the shape is variable and the rhombic leaves may be typical only of new growth on young plants. Up to the present time, there seems to be a safe indication that the species will bloom two or three weeks later than *R. reticulatum* thereby escaping the frost risks for the previous species, but unless it develops some as yet unseen charms, it does not appear to be a plant that one need seek for too ardently.

It is easily raised from seed, using the standard sphagnum moss method.

At the time of writing (1921) Dr. Wilson did not know of any plants in this country but the editor believes he has seen a reference to it in the collection of the University of California at Berkeley. He does not know of any



Robert L. Taylor

[See page 130]

Rhododendron Mariesii

previous illustration in this country.

The flowers are shown at natural size and all are from one lot of seed save the largest blooms at the top center.

Rhododendron Vaseyi A. Gray

(See page 102)

This native from the mountains of North Carolina has had a long history in cultivation and considerable attention particularly far away from home, for aside from being a very lovely flower, it is unique among the American species in the style and carriage of leaf and blossom. If for no other reason it would be prized for the very pure quality of the pink in the blossoms, no hint of lavender dimming their hues, that vary in seedling groups from deep, almost rose pink to tinted whites.

Although the existing native stands are limited, the plant does well over a wide range, most of the reports coming from the North rather than the South, and without report that altitude makes any great difference.

At the National Arboretum, the colony consists of a fine group of collected plants now about 4 to 5 feet in height, vigorously upright with many stems from the base forming broadly rounded tops. The site chosen by Mr. Freeman is a warm spot where many Ericaceous plants are native. Shade is broken by a few young native trees.

In spite of the competition of herbaceous plants, there is a little natural seeding. In a garden in Bethesda, where conditions are more horticulturally garden-like, seeding is reported as common.

The plant is deciduous with the flowers produced before the plants clothe themselves with the narrow almost peach-like leaves. It is hardy at the Arnold Arboretum where the fine

group near the small pond has often been photographed.

In the present classification of the azaleas, its shares with the rhodora, *R. canadense* Torrey, the Section Rhodora, in this country, while in Asia the representatives are *R. Albrechti* Maxim. the rather difficult *R. pentaphyllum* Maxim. and *R. nipponicum* Matsumura, of which only the first is commonly in cultivation here.

× *Rhododendron Simsii* "Jubilee"

(See page 133)

This clone of the Belgian group is reported as a sport from the more commonly grown Triomphe and the plant that furnished the flowers for the photograph has thrown a few branches with the typical crimson flowers of that variety.

Although Jubilé (Aug. Haerens, 1935) is also described as a sport of Triomphe or Triumph, it is also described as 'a large, beautiful, very double, salmon-violet colored bloom. Similar to Emma Eeckhaute,' and no mention is made of a flower like ours.

The picture is included here as much "for the record" as for any other reason but if it is in fact a sport from the self-colored Triumph or Triomphe (no record can be found for the use of the French spelling) it is the first case that has come to the records of the editor in which a striped flower has sported from a self-colored bloom although records have been seen. The reverse is common. Undoubtedly the whole story of this type of sporting has not been assembled, but data are being gathered from seedlings under observation, in which the pedigrees are known for several generations, and in time one may be able to deduce a basis for a "reasonable expectation" for sporting of this and other types.

In a general way, the flower in color



Robert L. Taylor

[See page 132]

Belgian Azalea, Jubilee

and pattern is not unlike the flower of the camellia variety Anita; namely a pale rose ground color completely dotted, sanded, striped and flaked with crimson. From a distance the color carries as a medium rose pink.

As in the case with many double flowers the pistil is perfect in many but not all blooms and seed can be had by hand pollination. Those blooms that appear normal except for a reduced style have not produced seed here even when the stigmatic surface was treated with the exudate from normal stigmas.

No seedlings have been flowered as yet so no reading can be given as to its possible value as a seed parent.

On our plant, no flower has yet shown stamens, but it is often the case that one may find on some few flowers of a normally double clone, a few perfect stamens with fertile pollen. Seedlings from such pollen are now being grown, but none is of flowering age, none however from Jubilee.

Recurring bloom

One of the interesting things that comes to attention when the amateur undertakes to grow the Belgian type of azalea under home conditions, and certainly while he is feeling his way in the matter, is that many of the plants tend to produce occasional flowers quite out of season. There are rarely enough to make a display or even to call special attention to the flowering but the

person who is interested in azaleas must notice all such phenomena.

Since the editor has been working in Mississippi he has noticed occasional flowering of the same sort on some plants growing out of doors, plants that have never shown such bloom in the northern garden. With a single exception, the one common ancestor to the whole lot has been a "macrantha" type of azalea. Among the clones of the Southern "Indian azaleas" the only varieties to produce these stray flowers have been those that suggest a similar pedigree, though the parentages are not known.

This is perhaps of minor interest and would not be noted if it were not for the fact that most writers have believed that *R. indicum* has had little to do with the modern Belgian azalea. The writer is of the opinion, that this is not the case and that in many varieties it is still the determining factor for many of the characters that are most prized. It is true that its progenies do not respond quickly or well to heat in forcing and it may be that in those varieties that survive for the Christmas trade, its influence is slight, but when one considers the enormous number of named clones that have been produced and that are still grown for winter flowering under almost cold house conditions, it seems wiser to be more moderate in one's statements regarding the ancestry of this mongrel lot of plants.

The Gardeners Pocketbook

Loniceras in California

This is going to be a tale of the bush honeysuckles. They are so *willing* and have habits that endear them to the busy housewife. First, they do not sucker all over like the lilac; second, their leaves are not a bother and soon disappear; third, they like my heavy soil; fourth, they are the first to leaf out in the Spring; fifth, they have berries like jewels. Why are they not sold in California? I suppose that they are not showy enough but if nurseries had a row in bloom I am sure they would go like "hot cakes." Where do I get them? All good nurseries in the East have them.

Lonicera korolkowi floribunda is my favorite but *L. bella albida* is fool proof. I take cuttings as the buds show and never lose one. Then, *Morrozvi* and *tatarica* are both good, especially the pink *tatarica*.

I have tried every hardy shrub in the last twenty-five years. Many did not like me, so when the bush honeysuckles grew and were happy and liked me, I loved them.

I did not mention that they do not make work in pruning. They need the oldest wood taken out every three or four years also any water sprouts that start high.

Altogether I do root for the Bush Honeysuckles and have given away dozens. I hope other gardeners will have them after reading this.

MRS. H. C. SCRUTTON

Petaluma, Calif.

Magnolia News

Possibly some definite information on the amount of cold that can be stood without injury by that grand tree, *Magnolia Campbellii* will be of some

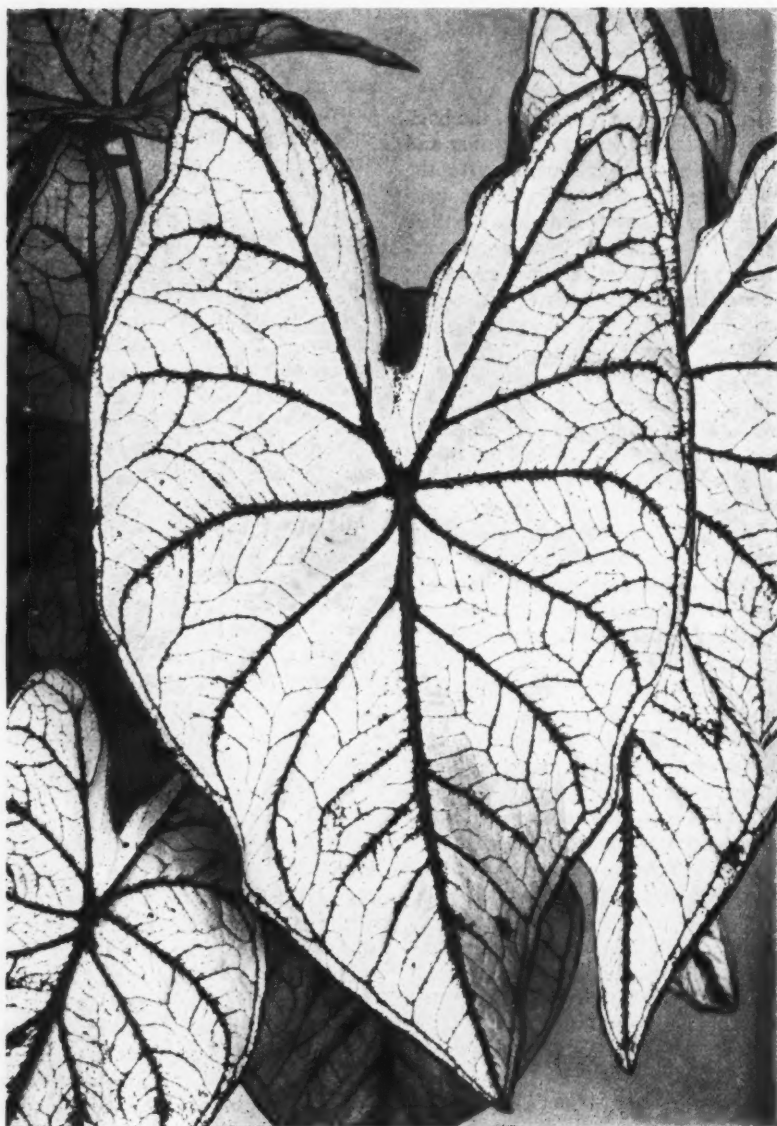
interest to you. We all know that it thrives in England but often loses its entire crop of flower buds, due to too great alteration of heat and cold in early Spring. In 1946, Mr. W. E. Bower of Stone Mountain Gardens wrote us that his young plant had endured 15° above zero without injury. The severe cold of last winter on the Pacific Coast has given us something further. The information supplied by Mr. H. Lem, a nurseryman of Seattle, Washington, who wrote that they had had a temperature of zero or below for eight nights, with the two coldest 2° and 5° below. At his first writing he stated that the tree was uninjured; but we suggested that it might be well to wait until about this time (April 13) and we have just received another letter to the effect that the bark is just as nice and fresh green as it was before the bad freeze came. He adds that not even the tip shoots were hurt in the least.

W. B. CLARKE

San Jose, Calif.

Future Copy

There is always some danger in announcing future copy, that something will go wrong with the material or with the writer's ambition, but so many members clamor or heckle for news that this bit is risked as a further reminder of what was said in the last news letter, namely that there will be a long piece on fancy leaved caladiums in 1951 and that it will be illustrated with as many cuts as possible. The plate that follows is a foretaste, for those who need to be shown part of what is in store. Not all of the varieties of caladiums have been photographed as yet as some of the newer sorts have



Robert L. Taylor

Caladium variety, *Candidum*

*Lester Roentree*

California Buckeye

not yet developed the normal adult patters on the leaves and a few are presenting some technical problems in getting the photographs to show the proper tonal ranges.

For those persons who arbitrarily say that they do not care for plants with variegated or colored foliage, it may be wise to remind them, that there was a time when this feeling that we so glibly claim for our own was not true and that the "reaction" against all such is the result of arbitrary opinions of a few persons, mostly British. We who agree like to feel that the finest taste has triumphed, but occasionally it is salutary to examine one's opinions and see if they are not as open to discussion as those that we feel we must reform. We need also to recall that variegated and colored foliage exists in Nature and that it is not all the invention of nurserymen or individuals with perverted tastes. On the other

hand one would not like to suggest that everything that is natural is sound or to find himself involved in defining what is natural! But one wonders why we living in a sunny land have to be limited by dicta from a dissimilar clime?

Of course the "flower arrangers" have already shown their approval for Rex begonia leaves regularly appear in unexpected company and striped Sansevieria raises her piebald tongues endlessly as the "vertical element."

The California Buckeye

In California, where evergreen trees and shrubs predominate, the native Buckeye, *Aesculus californica*, is a joy to those who find refreshment and calm restfulness in the unadorned bough for it remains stripped longer than any other leaf-shedding tree.

The period of bareness varies with

*Lester Rowntree**California Buckeye*

location for Buckeye inhabits the Lower and Upper Sonoran zones of the northern and central portions of the state and grows spottily in the hilly interior, where it goes to over 4,000 feet altitude, south almost to the deserts. In the cooler parts of these regions it may be the end of April before the large resinous winter buds release their shiny leaves which, when unfolded and with leaflets spread, resemble an outstretched hand. In July, as the Chamise goes into that dull green-brown stage it takes on for the months of drought, ceanothus bushes become laced with gray streamers of wild clematis in seed and poison oak leaves begin to scarlet. *Aesculus* foliage is preparing to depart by becoming honey colored. A little later the Buckeyes are russet brown at noon and the setting sun points up their low rounded forms with red. In August we once more have the artistry of leafless branch.

On the northern Californian coast large specimens lean toward the east blown into interesting shapes by ocean winds, their bark is silvered with the constant massaging of cool breezes and here Buckeyes' companions are plants which rejoice in moisture-filled air. Almost two hundred miles inland and far to the south, where the land ceases to be a valley and rises to meet the Sierra foothills, *Aesculus californica* occupies openings between blue green Digger pines and dark green live oaks and goes into partnership with huge monolithic stones suggestive of the druidic remains in north England. These granite pieces are decorated with lichens in green, gold and blue-gray, at their feet grow tall milkweeds with enormous leaves of silver felt, gray eriogonums feather crevices in the lower rocks and between arctostaphylos bushes the ground is riddled with the holes and runs of ground squirrels. When, in

*Lester Rowntree**California Buckeye—portrait*

early March, the Buckeye buds are swelling, sheets of gillias and phacelias in blues and purples, composites in

shades of yellow and other early wild flowers carpet the spaces between rocks and trees. In April the upstanding

cylindrical Buckeye flower panicles are honey-scented and bee busy. The calyces at the ends of short red flower stems are pink and red stamens jut from white flowers. May matures the flower and deepens the color of bloom; the leaves are already sere, the wild flowers have withered and the ripe stickers of bronco and foxtail grasses pierce the seed collector's skin. The hot dry air is fragrant with the bloom of wild grapes that festoon rocks and trees and with the smell of hot sun upon drying grass for the slopes beyond are no longer green but the color of hay. The backdrop is now that of browning hills so disliked by easterners and so loved by seasoned Californians.

During the summer the chestnuts on *Aesculus* trees form and expand. In autumn they hang, like small gray-brown pears, at the ends of stems four times their length. Then the sheath cracks into three parts and the handsome nuts are released. There are from one to three nuts in one shell and they are polished and extremely ornamental. If the nut is large and falls with a thud it may penetrate the layer of fallen leaves, touch the leafmold below and be lucky enough to keep moist and therefore viable until the rains come to sprout it, more likely, it rots like the leaves, thus adding to the richness of mulch which feeds the parent tree. Sometimes a nut lodges in the crack of a rock and finds moisture there to tide it over until winter. Then a stout curved caulicle, the embryo root system of the future tree enters the fissure and one more Buckeye comes into being.

LESTER ROWNTREE

Carmel, Calif.

Aucuba japonica

The value of broad leaf evergreens in ornamental plantings is unquestioned. The ways in which they may be

used vary widely which permits or requires plants of many different types. There is a considerable number of broad leaf evergreen species of value in ornamental plantings but many of them are not adopted to a wide range of conditions being limited by climatic conditions, by soil characteristics, by the rate and manner of their growth, by the character and habits of the plants with which they must be associated, and by many other factors. Therefore, it is quite advantageous to have a full knowledge of the characteristics, the behavior under different conditions, and the adaptability to all purposes of each species.

There is no very great volume of literature dealing with the characteristics of *Aucuba japonica*. It is reported to be quite variable in foliage characteristics, particularly with regard to size of leaf and the degree of variegation in the leaf, in fact the variegated form known as the Gold Dust Tree seems to be the one most generally planted. The yellow splotching of the leaves in this form is generally considered not to be a virus infection, but, due to a genetic character. The species is often considered only as a greenhouse subject and not hardy in the North. It is frequently considered to be rather exacting as to soil conditions requiring a most well drained fertile soil. My experience with the plant may be of some interest.

Plants from several different sources have been obtained and these have been of two types, the variegated and the all-green forms, each of which is quite distinct in other respects than variegation. One all-green type has narrower leaves and a somewhat different habit of growth. The variegated type usually has larger bolder leaves though there is considerable variation in this respect. Some forms have more than half of the leaf yellow in color while in other forms



Left, typical green bush; right, yellow dotted, fruiting branch

there is only a little flecking here and there. No exhaustive search was made for all the forms in the trade and a number of forms described at one time or another were not obtained. All the plants of the green leaf type grown here have been identical in the gross morphological characteristics and habits of growth.

Specimens of both types have been planted in fertile well drained sandy loam and in rather poorly drained heavy clay of low fertility and both types of soil were located in heavy shade and also in full sun. The behavior of these plants has led to the conclusion that the species is much less exacting in its growth requirements than is indicated by statements in the literature. It appears to be very drouth resistant. One specimen has grown moderately well in deep shade under scrub pine in a soil that is underlain with an impervious hard-pan which becomes extremely dry during hot periods in the summer. It tolerates deep shade from high overhead but may be more or less stifled by a close overgrowth of honeysuckle vine or of a close growing shrub having dense foliage. But its shade tol-

erant, drought resistant character is great enough to warrant its wider use in many places that show problems of this nature. Its planting need not be confined however, only to the difficult areas for when planted appropriately it can match in beauty that of many other evergreen shrubs grown in good soils. Its growth in good soil is moderately rapid and may become five or more feet in height in seven to nine years.

Branches when cut and placed in water remain green and fresh for a long period and may be especially useful for decoration where long lasting foliage is required. Branches laden with berries are particularly attractive for inside display.

In Arlington, Virginia both the green and the variegated forms have been quite hardy. They have come through the winters for nine years without any serious burning of the foliage. During this time the temperature has been as low as 3°-5°F. on three or four occasions. There does not seem to be very much published about the exact limits of its hardiness or the temperatures it will endure. It is reported as not hardy in the North Atlantic and the New

England States. The slowness with which the new growth hardens to the winter dormant state in Arlington would lead one to expect that it would not be hardy much farther north than Washington, D. C.

The flowers are greenish or purplish and inconspicuous but it bears large handsome bright red berries that remain all winter and a well fruited plant rivals or surpasses the holly in this respect. However, it is reported to be erratic in its fruit habits in many localities which agrees with my experience with the plant. This tendency to unfruitfulness may be due to several causes. It is dioecious and requires male as well as female plants in order to set fruit. The male and the female plants flower at the same time. The flowering of certain of the male and female forms in the trade do not co-incide exactly and in some years the difference is great enough to almost preclude fertilization. The flowers are produced very early in the spring and late frosts may completely destroy the crop. Even when they escape the frost, the weather is often cold and wet and thus unfavorable for insect pollination. All the plants of the green leaf type that I have obtained have been female and most of the variegated forms have been male, though one variegated form has borne a fair crop of berries. It would be interesting to know if spraying the female blossoms with one of the fruit setting hormones would result in a good set of fruit but the writer knows of no such experiments having been made. It would also be interesting to grow a lot of seedlings and note the variations in their fruiting habits, amount of variegation of the leaves and other characteristics.

Notes here and there in the literature in regard to its propagation indicates that it is not generally increased by

seeds. The method most generally recommended is by cuttings taken in late summer which root readily in the usual propagating mediums. If the propagating stock is in the greenhouse, cuttings may be taken at nearly any time when well ripened new growth is available. Branches may also be easily rooted by layering outside the greenhouse, but of course, this method does not permit rapid or extensive multiplication.

Transplanting may be done with very little danger of loss especially in the spring before new growth starts. Plants are best moved with a good sized ball of earth. The roots are large and brittle and it is nearly impossible to dig plants bare rooted without the loss of most of the fibrous part of the root system especially if the soil is hard or stony. Even when dug bare rooted the plants usually survive but recover rather slowly requiring a year or two to resume normal growth.

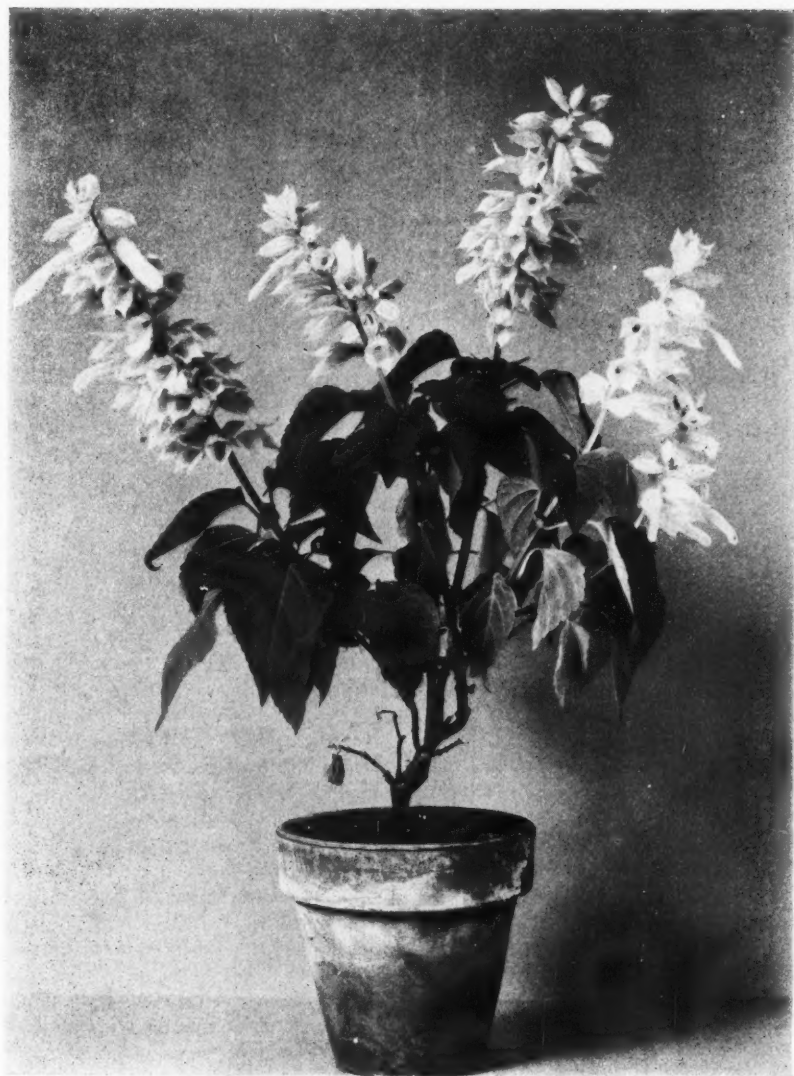
C. W. CULPEPPER

Virginia

Salvias

During the winter of 1935 I chanced to go with the manager of a local sugar plantation to the upper levels at which that plant grows — above the city of Hilo, Hawaii. There we came across a dilapidated and abandoned cabin. Among the tangle of plants growing about it was a *Salvia*, much resembling *splendens* in all respects except the flowers were deep plum purple. I gathered a few shoots from one of the plants and subsequently succeeded in rooting them in Honolulu. Later after proper inspection I was able to get them back to the greenhouses of the University of Chicago where they have continued to thrive and bloom very well during the last dozen years or more.

During the summer of 1935 a white sport appeared on some plants of the



*White sport from red "America"—Apr. 7, 1950
Greenhouse grown*

red flowered variety America which was being grown in the garden. The next winter all of these forms were inter-crossed. They hybridized readily in the greenhouses at Chicago. America \times purple resulted in a deep mahogany red which was called Wine. It has the vegetative habits of America. White sport \times purple resulted in a lavender flowered form and white sport \times America gave a pleasing salmon similar to the variety Salmon Queen. Later it was determined that the white sport and purple forms breed true from seed as does the salmon red hybrid. But the wine segregates into purple, wine and red, and the lavender hybrid segregates into purple, lavender and white. The lavender \times salmon hybrids resulted in a pleasing deep rose color which does not breed true from seed. All forms are readily propagated by cuttage, are vigorous in habit, and bloom very freely in the greenhouse during the winter months making desirable pot plants especially in March and April. They are also attractive when used in porch boxes and in open beds, the salmon, lavender and white combinations being especially effective when the dark purple and wine forms are used as backing against shrubbery. Now, at the beginning of April, here at Corvallis, Oregon, a greenhouse bench of these various colors except red, in pots, is a sheet of brilliant color.

E. J. KRAUS

Oregon

Thoughts after Viewing the Alexandria, Va. Daffodil Show.

More and more daffodil breeders seem to be adopting the P. T. Barnum Show slogan: Bigger and Better—with accent on the "bigger" but question mark after the "better" (this last observation is mine, not the breeders). So we now have cartwheels and dish-

pans, megaphone trumpets and flounce sunshades instead of the graceful, lovely flowers which the narcissus clan started out to give a garden-minded humanity. It was therefore with a most pleasant shock that I saw displayed in that delightful Daffodil Show staged in Alexandria this year by the Garden Clubs of Virginia, that there were still some gardeners brave enough to stage some of the refined beauties of the past—and of course favorites of mine.

Before commenting upon old favorites shown there it would be well to state my view point. That grand and glorious white trumpet, Beersheba was tied as best flower of the show with a perfectly huge flat cupped flower called Kansas. It was a grand flower with very fine color; but it was not a daffodil, it was something else. Personally I would not have it in my garden, but that is beside the point. Now a trumpet is naturally the largest type of narcissus and therefore has a right to be bigger before it exceeds the bounds of daffodil decency; and the flower of Beersheba which was shown was "plenty big" and I would not have wanted to overfeed it to reach that stage of obesity, preferring others of lesser size that were in the show. But a trumpet has a right to have a large size and I will not quibble over that. But a cupped or eyed narcissus has no right to be gigantic no matter how splendid its coloring is; when it suffers from elephantiasis it ceases to be normal and becomes an eyesore to the discriminating gardener. There are plenty of large sized cupped daffodils of great charm and beauty without needing to resort to monstrosities of high multiple polyploidy. Dear reader, if you disagree with these ideas it will be waste of your time to read further.

It would be well at this point to state that by old daffodils I mean those in-

roduced before 1910 and I shall give the date of introduction after those I speak of. Of course King Alfred (1899) was still shown and probably will be for many years to come and after many of its kindred that are now top-notchers will have been forgotten; it will still be both a splendid garden flower and exhibit blossom because of its deep rich color and its splendid form. There are few gardeners who would give it up for larger fry or greater notoriety. As I passed down the benches from 1a through the new classification, it was pleasant to find a gardener displaying Emperor (1890) among the modern giants. And Emperor held its place for it has a grace and refinement which is often not found among its larger fellows. These two yellow trumpets no lover of daffodils can be without and to them I would add Michael (1907) and Cornelia (1905), neither of which were in the show and Cleopatra (1903) which was.

Passing on to the next section, W. P. Milner (1890) was shown by several contestants. Somehow it has never entirely endeared itself to me. It is not quite a bicolor, at least to my eye, nor a white trumpet; and the form and size of its flowers are not just right for its height. But I would hasten to say I was both glad to see it shown and I would not willingly exile it from my garden—only there are other old ones I would place ahead of it.

And one of these is Apricot (1898) which to my great delight was shown. While it looked sadly small among its larger sisters and had not a chance to display its soft and lovely coloring in the electrically lighted hall its charm was evident to all who have a daffodil eye. If your idea of the color term "apricot" is a yellow with a fairly strong tinge of pink in it you will scoff at this flower name; but please recall

that the color of the fruit's flesh is a strong warm mellow yellow and that only a very modernistic artist would see anything but the faintest glow of pink in it. With this warning visualize a rather flaring, narrow segmented perianth of creamy white and a straight, longish, narrow trumpet of "apricot" which has an interior glow. It is rather a loosely constructed flower compared with Spring Glory and on which the addicts to size should never spend any money.

Now while I have no intention of getting excited over the species as they are quite beyond the scope of these notes, I do want to say a few things about a small white trumpet which was displayed several times, in other sections however, and under at least two names; and which to my eyes were hardly different from what our daffodil-mingled editor grows in his garden as *N. albicans*. Being a pedant I must say this name no longer has good standing for Pugsley, in his monograph on the subgenus *Ajax* renamed it *N. albescent* because the specific name *albicans* had been used by Sprengel (1825) for what is a form of *N. Bulbocodium*. Now to begin at the start again; flowers displayed under the name of *N. moschat* were correctly labeled but those shown as *N. cernuus* (sad to say, for I love that name—especially when correctly pronounced with a k sound at the beginning) should have been *N. moschat* which is Pugsley's corrected name for what used to be called *N. cernuus*; and what we have been used to call *N. moschat* of *Haworth* is now to be known as *N. alpestris* of which there were none in the show. But there was another flower labeled *N. moschat* which was like the "albicans" in Mr. Morrison's garden and both differ from what I knew as "albicans" thirty and more years

ago. As a boy I twice had bulbs bought under that name and I clearly recall they were taller, larger in the blossom, with less drooping perianth segments and rather coarser in texture. Of course the recollections of childhood often get badly confused but I do know this that I had "albicans," that I never had so dainty a flower as the "albicans" of Mr. Morrison's garden and that when I got Mme. de Graaff (1887) I no longer grew "albicans" because I decided Mme. de Graaff to be a larger and a finer flower. All this has been injected into these notes because I feel certain that in old Virginia gardens there could be found three, four or five white daffodils which would fit into the names given above and the larger white which I once had — and would like to see again.

Passing on into the cupped section I was glad to see Bernardino (1907) and overjoyed to find Homespun (1907); and so encouraged I looked for Autocrat (1890) and Gloria Mundi (1887) which I did not find. Bernardino has always seemed to me to be all a garden daffodil should be; it counts in the garden picture, has grace, color and distinction—it has a good perianth and a soft yellow cup with a flush of orange in it. It has faults in its shape, according to show-table experts, which are lost in the garden picture. Homespun too is rather weak as an exhibitor's flower but to the gardener who loves daffodils it has great charm and grace; it is not large in the modern sense but is beautifully proportioned with a well formed rich yellow perianth and a largish and wide mouthed cup of a slightly deeper yellow. There was a time when Homespun "walked away with the show" every time it was exhibited; and I have a rather persistent idea that some of those who are "walking away" at the present time will have walked straight out of the picture long before

Homespun has been put on the trash pile.

When I saw Salmonetta (1907) I almost shouted for joy. I had lost it in the passing of the years and wanted it badly. Of all the above, Salmonetta would be the least to appeal to those of the exhibitor's-table clan. A smallish—to be quite honest, a little flower and salmon only by courtesy or even flattery if the truth must be told—but charming, endearing and sweet. A clear white perianth of long oval segments which are not very close together rather flippantly surrounds a small beautifully fluted cup of soft delicate palish salmon, apricotish orange—if you can blend these in your mind's eye to a softly glowing and yet quiet shade of yellow. True, also, the flower does not have very much body or texture but it makes a fine show in the garden, provided it does not have to compete with strong colors or large sized flowers; and it is delightful for cutting.

May I now make a suggestion? Why not have a separate section in the Daffodil Show where old varieties, say prior to 1910 introduction, could be shown without competition with their overgrown off-spring? In many Virginia gardens — and elsewhere too—there are many of these old forms awaiting the zealous collector. And, much to my joy, the price list issued by one of the exhibitors in the lobby outside the hall contained all the above and many others. But what has become of Beauty, Lemondrop, Mary Magdalen de Graaff, Mermaid, Incognita, Frank Miles, Virgil, to mention only a few. Then too there is the Phoenix clan those good fat bunches of color with wholesome country-bred common names which give them such a pleasant old-world garden association: Butter and Eggs, Eggs and Bacon, Codlins and Cream.

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